HYDRO:EVOLVED

SOFT STARTER STARTUP MANUAL
SIEMENS
HYDRAULIC INSTALLATION

VERSION 1.01

SMARTRISE

Document History

Date	Version	Summary of Changes
July 23, 2024	1.01	Updated Document Presentation. Reviewed the *Valve Board* subsection under the *Wiring* section. Reviewed the *Motor/Soft Starter* subsection under the *Wiring* section. Reviewed the *Construction* section.
January 30, 2021	1.0	Initial Release.

Table of Contents

List of Figures

List of Tables

1 Siemens Soft Starter

The Siemens soft starter is used on hydraulic controllers.

Figure 1: Siemens Soft Starter

2   Equipment/Settings Verification

Set and verify the equipment matches the job specific parameters for proper operation. See *Hydro:Evolved* sheet 3 Table for more information.
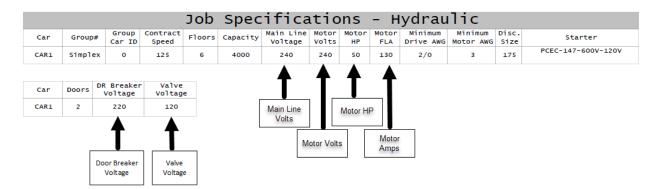

Figure 2: Example of Parameter Table

3 Grounding Requirements

NOTE: A proper and effective building ground connection is required for the safe and successful operation of the controller.

Examples of a proper building-to-controller ground are as follows:

1. Attach the ground wire to the street side of a water main.
2. Attach the ground wire to a grounding rod in the pit.

The controller has a common ground bus terminal connection.

Figure 3: Ground Bus Terminal

NOTE: The building, motor, transformer, and filter(s) must all share a common ground. This removes ground loops, limits impedance, and routes noise into the ground.

4 Wiring

A checklist must be completed during the soft starter wiring process. See Appendix 2 for terminal location.

4.1 Power

Perform the following to connect power. See the *Hydro:Evolved* sheet *7* for job specific information.

- Connect main line power L1/L2/L3 to soft starter.
- Connect the ground wire to the green terminal screw on the soft starter mounting plate.

4.2 Valve Board

Perform the following to wire the valve solenoids:

1. Connect CL and CH from the Valve board to BN± on the MR board.
2. Connect NTS output from the MR board to NTS input on the Valve board.
3. Connect SAFE output from the MR board to SAFE input on the Valve board.
4. Connect Neutral from the valves to N on the Valve board.
5. Connect UPH, UPL, DNH, and DNL from the solenoids to the Valve board.

   NOTE: All connections between the valve board and SRU/Siemens, as well as Siemens to SRU, are factory-wired; thus performing these connections are typically unnecessary. The manual specifies certain connection points and inputs, but these exact terminals are not used every time.

4.3 Motor/Soft Starter

Perform the following to connect the soft starter to the motor. See the See the *Hydro:Evolved* sheet *8* for job specific information for job specific information.

1. Connect the SS fault output of the starter to the drive fault input on the controller.

   NOTE: This is factory-wired; thus, this should not be necessary on jobs shipped from Smartrise.

2. Connect the Start Motor (SM) on the Valve board to the soft starter.

Perform the following for a 6-Lead Delta Wiring.

1. Connect the 6/12-Lead motor lead to terminals T1/T2/T3 on the soft starter and T6/T4/T5 on the fault connector.
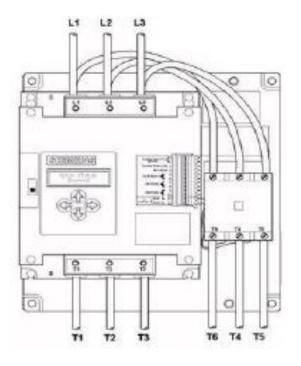
Figure 4: 6-Lead Delta Wiring Configuration

The table below lists the 6/12 Lead Delta Motor Wiring.

Table 1: 6/12 Lead Delta Motor Wiring

Terminals		T1	T2	T3	T4	T5	T6	Jump
Single Voltage	(208-575 VAC)	1	2	3	4	5	6	N/A
Dual Voltage	Low (220-240 VAC)	1,7	2,8	3,9	10,4	11,5	12,6	N/A
	High (460-480 VAC)	1	2	3	10	11	12	4 and 7 5 and 8 6 and 9

Perform the following for a 3-Lead Delta Wiring.

1. Connect the 3/9-Lead motor lead to terminals T1/T2/T3 on the fault contactor.
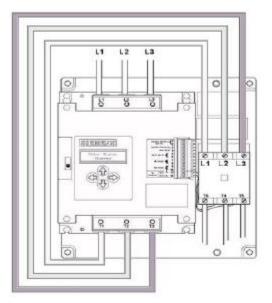
Figure 5: 3-Lead Line Wiring Configuration

The table below lists the 3/9 Lead Line Motor Wiring.

Table 2: 3/9 Lead Line Motor Wiring

Terminals		T6	T4	T5	Jump
3-Lead Motor	(208-575 VAC)	1	2	3	N/A
9-Lead Motor	Low (220-240 VAC)	1,6,7	2,4,8	3,5,9	N/A
	High (460-480 VAC)	1	2	3	4 and 7 5 and 8 6 and 9

5   Construction

All safety inputs are functional during Construction mode on the Hydro:Evolved controller. When these safety devices are installed, they are connected even if still on Construction mode. See page 5 for safety input connections. The following includes instructions for when none of these devices have been installed prior to beginning on Construction mode.

Perform the following to wire the Construction Box. See page 4 for the Construction Mode connections.

1. Turn off power to the controller.

2. On the MR board, connect a jumper from L120 to terminals LFT, LFM, and LFB.

3. Are there rear doors?

    a. If there are rear doors, connect L120 to terminals LRT, LRM, and LRB. Go to step 4.

    b. If there are no rear doors, go to step 4.

4. Connect a jumper from H120 to PIT, BUF, BFL, and TFL.

5. Connect a jumper from M120 to SFM and GOV.

6. Is a Run/Stop switch being used?

    c. If a Run/Stop switch is used, go to step 7.

    d. If a Run/Stop switch is not used, connect a jumper from H120 to SFH. Go to step 9.

7. Connect a wire from the MR board H120 to one side of the Construction Box Run/Stop switch.

8. Connect a wire from the MR Board SFH to the other side of the Construction Box Run/Stop switch.

    NOTE: A closed switch indicates run and an open switch indicates stop.

9. Is the run box being used?

    a. If the run box is being used, perform the following:

    • Connect the UP button to the input of the CUP.

    • Connect the DOWN button to the input of the CDN.

    • Connect the Enable to CEN (jump high if not available).

    • Power up the controller by turning on main power, pressing in all push breakers, and turning on the L1/L2 breaker.

    • Go to step 10.

    b. If the run box is not being used, power up the controller by turning on main power, pressing in all push breakers, and turning on the L1/L2 breaker. Go to step 11.

10. Press the right button to access the Main Menu and navigate to Setup | Miscellaneous | Enable Const. Box to On. Scroll right and press Save.

NOTE: When the Enable Construction Box is On, the onboard inspection buttons are disabled.

11. Verify the Car Door Bypass and Hoistway Bypass switches are in the OFF position.

12. Place the INSPECTION switch to INSPECTION.
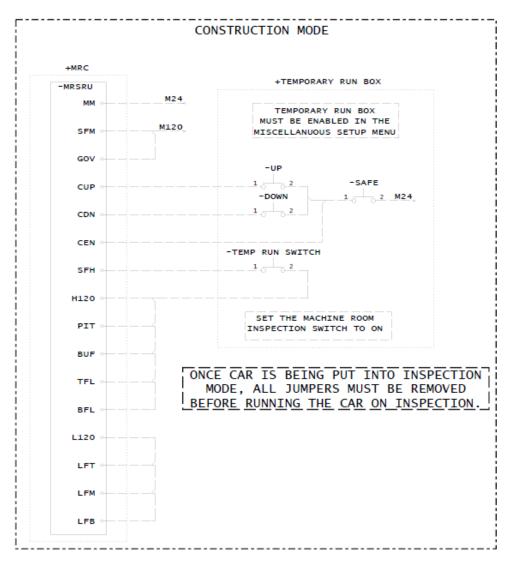
13. Verify the mode of operation is Construction.

Figure 6: Example of Construction Wiring

6 Powering Up

Perform the following to power up the soft starter. Complete the checklist during the verification process.

1. Apply external power by closing the main disconnect.

2. Close the two-pole breaker and all pushbutton breakers.

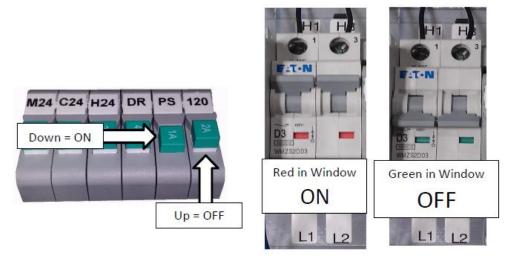3. Verify the LCD on the MR board and the soft starter power up.

Figure 7: Breakers

7   Final Setup

Perform the following to set the Bypass Term Limit. Complete the checklist during the verification process.

NOTE: The selected menu within the menu options is shown with a *.

1. Toggle the Inspection/Normal switch to INSP position.

2. On the MR board, press the left arrow (ESC) button several times to get to the MAIN SCREEN.

3. Press the right button to access the Main Menu.

4. From the MAIN MENU, scroll and select Setup.

Figure 8: MAIN MENU – Setup

5. From the SETUP menu, scroll and select Miscellaneous.

Figure 9: SETUP Menu – Miscellaneous

6. From the MISCELLANEOUS menu, scroll and select Bypass Term Limits.

Figure 10: MISCELLANEOUS Menu – Bypass Term Limits

7. From the BYPASS TERM LIMITS menu, set the BYPASS TERM LIMTS to ON.

Figure 11: Bypass Term Limits Menu

8. Scroll right and press Save.

9. Press the left button several times to get to the MAIN SCREEN.

10. Verify the LCD displays Construction Mode on the MAIN SCREEN.

8   Operation

Run the car and complete the checklist during the verification process.

8.1   No Faults

Make sure the car is moving without triggering a fault either on the MR board or the soft starter. If the MR board displays a soft starter fault, look at the soft starter to see what the fault is. See Soft Starter Fault for troubleshooting faults.

8.2   Proper Direction

Make sure the car is moving in the same direction as the control switch on the Run Box. See Wrong Direction for troubleshooting proper direction faults.

8.3   At Speed

Make sure the car is moving in both directions and at the proper inspection speed. If the inspection speed is equal to contract speed the car should move at high speed. If the inspection speed is less than contract speed the car should move with leveling speed. See Car Not Moving or Too Slow for troubleshooting at speed faults.

8.4   Under Control

Make sure that the car is moving under full control. The car should stop when commanded from the Run Box. Verify that the car runs with no faults for 10 seconds or more. See No Control for troubleshooting under control faults.

9 Troubleshooting

The following sections list troubleshooting procedures.

9.1 Soft Starter Fault

If the Smartrise controller indicates a soft starter fault and the soft starter has the fault LED flashing, see Appendix 1.

9.2 Wrong Direction

If the motor is running in the wrong direction, swap any two motor leads.

9.3 Car Not Moving or Too Slow

If the car is not moving or to slow perform the following:

- If the car does not move, verify that the valve relays are turning on when a direction is given (for example, UPL and SM for the Up direction and DNL for the Down direction.
- Measure the outputs to verify that the Valve board is working properly. If the proper voltages are present, check the wiring and the valves.
- Adjust the valves as required to get proper starts, stops, and run speeds.
- Verify the valve status by navigating to STATUS | VALVE 1 STATUS.

9.4 No Control

- If there is no control perform the following:
- Verify the SFM and SFP relay are high when commanding the car to move.
- Verify the fault contactor is engaging when the car is commanded in either direction but the pump motor only comes on in the Up direction.
- Verify 120 VAC is present when the car is being commanded to run on the MR board for:
  - UPH
  - UPL
  - DNH
  - DNL

10 Appendix 1 Siemens LCD Troubleshooting Chart

The table below lists Troubleshooting Solutions.

Table 3: Troubleshooting Solutions.

Symptom	LCD Indication	Problem	Solution
LCD not working	No characters displayed on the LCD screen	Voltage too low or not present at Control Power terminals 1 and 3.	Confirm that the control voltage is 120VAC between terminals 1 and 3.
		Defective Starter	If the voltage is greater than 85 VAC, replace the starter.
Motor will not start	Status Ready	Voltage too low or not present at Run Input terminal 4.	Confirm that the voltage of 120 VAC is present between terminal 3 and Run Input terminal 4. If there is at least 80 VAC present and the screen still displays "Ready", replace the starter.
	Control Voltage Power Down	Voltage is too low at Control Power Input.	If the voltage is less than 105 VAC, correct the voltage problem. If the voltage is greater than 105 VAC, replace the starter.
	Control Voltage Brown Out	Voltage is too low at Control Power Input.	If the voltage is less than 105 VAC, correct the voltage problem. If the voltage is greater than 105 VAC, replace the starter.
	Control Voltage Over Voltage	Voltage too high at Control Power Input.	If the voltage is greater than 140 VAC, correct the voltage problem. If the voltage is less than 140 VAC and the starter is indicating this fault, check for distortion at the peaks of the waveform. Contact Technical support for further information.
	Fault EEPROM Memory	The starter has detected a problem with the EEPROM memory.	Replace the starter.
	Fault ROM Memory	The starter has detected a problem with the ROM memory.	Replace the starter.
	Fault Watchdog	The starter has detected an internal fault.	Replace the starter.

Symptom	LCD Indication	Problem	Solution
Motor will not start cont.	Wrong Rotation CBA set as ABC or Wrong Rotation ABC set as CBA.	Incoming three phase is opposite of the Line Rotation setting.	**Disconnect Line Power:** Change two of the incoming phases and verify that the motor is spinning in the correct direction. If the motor does not turn in the correct direction, change the incoming phases back to their original connections and go to the Parameter menu to change the Line Rotation setting.
	Fault Motor Wiring	The motor is not correctly connected to the starter.	**Disconnect Line Power:** For In Delta Applications, the following measurements should be less than 10 ohms: T1 to center leg, bottom of Fault Contactor. T2 to right leg, bottom of Fault Contactor. T3 to left leg, bottom of Fault Contactor. For In Line Applications, the following: Measurements should be less than 10 ohms. T1 to T2, T2 to T3, T3 to T1 Connect wiring if necessary.
		Fault contactor is not being energized.	Verify that the fault contactor is being energized after power up. You should hear it pull in then drop out upon power up. If not, measure the voltage from terminal 9 to terminal 12. This should be 110 VAC. Correct any wiring errors if necessary. Connect a voltmeter to terminals 9 and 12. Push the up and down arrows simultaneously and look for the voltage to appear briefly across these terminals. Correct any wiring errors if necessary. If the particular elevator's controls require the fault contactor be cycled with each run, the starter can be configured to check for motor wiring faults only when the motor run command is initiated. Consult technical support for further assistance.

Symptom	LCD Indication	Problem	Solution
Motor will not start cont.	Fault Motor Wiring cont.	Motor is wired correctly; starter still indicates Motor Wiring fault.	**Disconnect Line Power.** With an ohmmeter, check for a shorted SCR by measuring the resistance of each phase from the line to load terminals. A shorted SCR typically has a resistance of less than 3000 Ohms. If all three S.C.R.s are acceptable, proceed with the next steps. Move the jumper wire from 9 to 10 on the terminal block. Re-energize equipment. Verify that the fault contactor is energized and remains in. Measure the voltages across the poles of the fault contactor. If all voltages are less than 5 VAC, **Disconnect Line Power** to the equipment and move the jumper wire back to terminal 9. If any of the poles have voltages higher than 5 VAC, contact technical support for further assistance.
	Fault Shorted SCR A or Fault Shorted SCR B or Fault Shorted SCR C	The starter has a shorted S.C.R. in the indicated phase.	**Disconnect Line Power**. With an ohmmeter, check for a shorted SCR by measuring the resistance of each phase from the line to load terminals. A shorted SCR typically has a resistance of less than 3000 Ohms. If the S.C.R.s are acceptable, and the wiring configuration is In Line, Consult technical support for further information.
	Fault Highline Volts	The unit has detected a highline condition on the incoming voltage lines.	Check the Line Voltages in the Status Menu. If one or more of the incoming lines are over 528 volts for 460 volts units or 632 volts for 575 volt units, verify the reading with a meter. If the meter reading matches the starter's reading, correct the voltage problem. If the meter reading does not agree with the starters voltage reading, contact technical support.

Symptom	LCD Indication	Problem	Solution
Motor Starts, but does not come up to speed in a timely manner, or at all.	Status Maintain Start before switching to Status Ramp to 450%	Current limit is set too low or there is an excessive load on the system during the start.	Check the current limit setting in the Parameter menu. This should not be set below 200%. Verify that the overload setting is correct. Verify that the valves are not being energized during the start. Increase current limit if necessary. If using the starter "In Line", verify that the unit is sized correctly for the motor.
Motor trips out on a fault after coming up to speed. Fault Low Leg Amps	Fault Low Leg Amps	The starter has detected an imbalance in the motor currents.	Check the fault currents in the Fault Menu or with a computer or PDA using the required interface. Compare these to the currents seen during the start and before the faults occur. If possible, verify the currents with a clamp on ammeter. Check the voltages across the SCRs, by measuring across the line and load terminals, when the unit is up to speed. These voltages should be less than a few volts. If any are above 10 VAC, contact technical support. The Default trip point for the ratio of the lowest to the highest current is .33. This setting is adjustable in the OEM menu accessible via a password. If the setting has to be adjusted, contact technical support.
	Fault Phase Loss	The starter detected a problem with the incoming three phase power during a run condition.	This fault will reset when the power returns to normal. To view the exact line voltages when the fault occurred, view the diagnostic screen via a laptop computer or PDA.

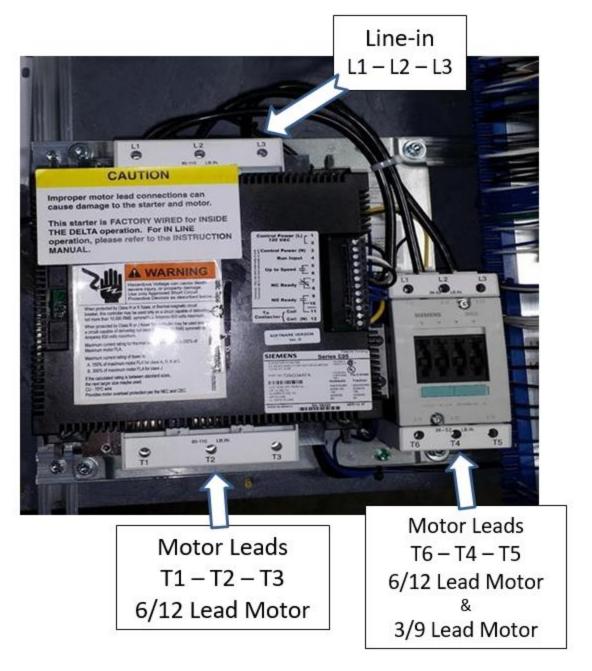| Symptom	LCD Indication	Problem	Solution
Motor trips out on an Overload fault after coming up to speed.	Fault Overload	The Overload setting is set too low.	Check the fault currents, Run Status and Run Time; accessible in the Fault Menu or with a computer or PDA using the required interface. For Inside Delta applications, displayed fault currents should be multiplied by 1.73 to get an approximate line value. Verify the fault occurred during the "Maintain Current Limit", "Ramp to 450%" or "Maintain 450%". Verify the starting current limit is set to at least 200% of the motor FLA. If the overload fault is occurring during the "maintain 450%" and the run time is several seconds, there may be a mechanical issue preventing the motor from coming up to speed. Verify that there is some type of viscosity control, either heaters or re-circulation. If this is not the case, contact technical support for assistance on configuring the "Instantaneous Stall Protection".
		The starter has detected an Overload condition while up to Voltage	The overload setting should be set to the FLA of the motor. If the overload is set correctly you need to determine the cause of the higher currents. If the fault currents multiplied by 1.73 are in excess of the Power Unit's rated amps under a Full load condition, there may be a mechanical problem. In addition to the above, if the overload mode is set for "All 3 Phases" and one winding's current is significantly higher than the other windings, nuisance overload trips may occur during long up runs near or at the rated up load.

11 Appendix 2 Terminal Locations

Figure 12: Terminal Locations